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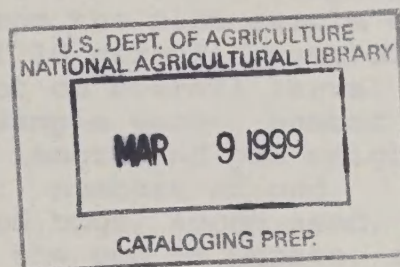
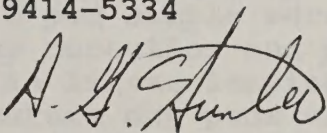
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August 20, 1996

SUBJECT: Final Report for Specific Cooperative Agreement,
58-6659-2-007
Auburn University (O.L. Chambliss, PI)
"Evaluation of Cowpea Germplasm for Resistance to
Cowpea Curculio and Other Insect Pests"
May 15, 1992 thru May 14, 1996

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The *Vigna* Crop Advisory Committee to the USDA National Plant Germplasm System has identified cowpea curculio resistance as a top priority evaluation need. Higher levels of resistance to cowpea curculio than currently available are needed to enhance control and decrease the use of extremely high quantities of toxic insecticides.

MATERIALS AND METHODS

Germplasm evaluated

Germplasm accessions previously shown to be of value for insect resistance, disease resistance, or attributes of special interest were screened for resistance to cowpea curculio, *Chalcodermus aeneus* and pod bugs (southern green stink bug, *Nezara viridula*, and leaf-footed bug, *Leptoglossus phyllopus*) in field plots in southeastern Alabama where natural populations of these insects are abundant. Based on knowledge of prior performance, we screened 300 accessions from the following sources: 79 breeding lines from the IITA advanced trials; 100 accessions being evaluated and increased by UC Riverside, USA, prior to being assigned a PI number in the National Germplasm System; 101 plant introductions previously reported to have resistance to cowpea curculio, or other insects or diseases, and 20 check lines (Table 1.) with known resistance or susceptibility to cowpea curculio, pod bugs, or cowpea weevil. Entries were grown in 0.9 x 4.5 m plots in a randomized block design with 3 replications. Plots were planted in mid June to synchronize pod development with the natural cowpea curculio population. No insecticide was applied.

Data collected

An assessment of pod bug damage to immature pods was made by counting the number of shriveled and sound pods in the central

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0.6 meter section of the plot. Seed damage by pod bugs was assessed on dry seed samples after harvest. When most of the pods in a plot were dry, a sample of approximately 100 dry pods per plot was taken to provide insect damage data. Curculio larvae were collected as they emerged from these samples, oven dried, and weighed to determine average larval weights.

Cowpea curculio damage data were collected from two sub samples. One consisted of 25 pods taken at random from the plot sample of dry pods and the other a selected sample of 10 curculio punctured pods taken to determine the genotypic effect on overall larval survival. Data collected from the 25 pod sample were: number of larval exit holes in pod wall, average pod length and pod weight. Data collected from the 10 pod sample were: numbers of pod punctures, seed damaged by curculios and pod bugs, sound seed, exit holes made by curculio larvae leaving the pod to pupate, and the force required to puncture dry pods using a 1 mm diameter probe on an Instron test machine with a 500 kg load cell.

RESULTS

Results were obtained from 288 of the 300 entries in the evaluation, see Table 2.

Cowpea curculio resistance

Larval exit hole data is commonly used as a measure of overall curculio resistance, regardless of the nature of the resistance. A low number of exit holes per pod indicates that either few eggs were deposited in the seed or a low number of curculios survived, for whatever reason, to exit from the pod to pupate. Approximately 60% of the germplasm entries were distributed in almost equal frequencies in class intervals from 6 to 12 exit holes per 25 pods with some 48 of the 288 entries falling into the most frequent class, 8 exit holes. Known curculio resistant lines had 7.7 or less exit holes per 25 pods. Among six check lines with known curculio resistance, AU 85-CCR-20 ranked in the top 1%, Freezegreen ranked in the top 8%, CR-18-13-1 and CR-22-2-21 ranked in the top 20% of the entries with 2.0, 4.3, 6.7, and 7.0 larval exit holes per 25 pods, respectively. Only one entry, PI 218122 had less exit holes than AU 85-CCR-20 with 1.4 per 25 pods. The most susceptible entry had 46 holes per 25 pod sample. Approximately 72% of the entries sustained more curculio damage than the best of the resistant check lines. Of the eight lines with reported pod resistance to cowpea weevil (92.3 to 99.9% larval mortality) four ranked in the 27% having the fewest exit holes.

Similar data were obtained for larval exit holes on the 10-pod selected samples. These data would give some general indication of antibiosis and would tend to discount preference since only damaged pods were included in this sample. A higher

0.6 meter section of the pile. Sand samples by test were
 assessed on dry sand samples after 15 minutes. When one of the
 piles in a pile was dry a sample of approximately 100 gms
 per pile was taken to provide enough for 10 samples.
 Samples were collected as they emerged from the sampler, then
 dried, and weighed to determine average lateral weight.

Compensating for the damage data were collected from one and weighed
 One consisted of 25 gms taken at random from the pile weight of
 dry pile and the other a selected sample of 10 gms of the pile weight
 both taken to determine the average lateral weight of the pile.
 Weighing. Data collected from the 25 gms sample were weighed in
 lateral weight in dry soil. Average and lateral weight and weight
 Data collected from the 10 gms sample were weighed in lateral
 punchings, and weighed by individual and dry weight. Total load
 exit holes and is described lateral weight in dry soil, and
 the force required to produce dry soil using a 1 m diameter
 probe on an 18 inch test machine with a 500 lb load cell.

RESULTS

Results were obtained from 200 of the 200 samples in the
 evaluation, see Table 1.

Compensating for the damage data

Lateral exit hole data as normally used as a measure of soil
 all horizontal resistance. Resistance at the bottom of the
 resistance. A low number at exit holes per foot resistance (CR)
 either low values were assigned to the soil as a low number of
 resistance. The average value of the CR was 1.0. The CR was
 process. Approximately 50% of the CR values were
 distributed in almost equal frequencies in the CR values from 0
 to 1.0 with the CR values from 0 to 1.0. The CR values
 falling into the CR values from 0 to 1.0. The CR values
 CR values from 0 to 1.0. The CR values from 0 to 1.0. The CR values
 among the CR values with low values resistance. CR 0.0-0.5
 10 ranked in the CR 0.0-0.5. The CR values from 0 to 1.0. The CR values
 10-1 and CR 0.5-1.0 ranked in the CR 0.5-1.0. The CR values
 1.0, 1.5, 2.0, and 2.5 ranked in the CR 1.0-1.5. The CR values
 respectively. Only one entry of CR 1.5-2.0 and less than 1.0
 CR 0.0-0.5 with 1.0 CR 0.5-1.0. The CR values from 0 to 1.0. The CR values
 had 10 holes per CR 0.5-1.0. The CR values from 0 to 1.0. The CR values
 suggested more CR values than the CR values from 0 to 1.0. The CR values
 check lines. Of the CR values with low resistance CR
 CR values from 0.0 to 1.0. The CR values from 0 to 1.0. The CR values
 CR values from 0.0 to 1.0. The CR values from 0 to 1.0. The CR values

Results data were obtained from lateral exit holes on the 10
 CR values from 0.0 to 1.0. The CR values from 0 to 1.0. The CR values
 CR values from 0.0 to 1.0. The CR values from 0 to 1.0. The CR values
 CR values from 0.0 to 1.0. The CR values from 0 to 1.0. The CR values

number of exit holes per pod was apparent in the data from the 10-pod selected sample as compared to the 25-pod sample (0.6 compared to 0.3 for the most frequent class in the distribution). Since all pods in the 10-pod sample had been punctured by adult curculios there was a higher probability of larvae being in the pod and surviving to exit the pod than in the 25-pod sample in which some pods were not damaged by adults, by chance. The distributions are similar for both sets of data. Among the entries ranked in the top 10 for larval exit holes, five entries were in the top 10 in the 25-pod sample as well as in the 10-pod sample. These were Charodi, PI 218122, Vita-5, Bambey-5, and TVu-3046. Our most resistant check, AU85CCR-20, ranked second in the 25-pod sample and 14th in the 10-pod sample. Among the entries ranked in the bottom 10 (those with the highest number of exit holes), IT86D-792 was the only one ranking this low in both the 25-pod sample and the 10-pod sample. It ranked second from the bottom with 40 exit holes in the 25-pod sample and third from the bottom with 25 exit holes in the 10-pod sample.

The average number of punctures per pod gives an indication of the extent of antixenosis or non-preference. Entries with extremely low numbers of pod punctures are either not attractive or repellent to curculio for feeding or oviposition. Slightly more than 75% of the entries sustained pod punctures distributed between three and seven per pod. Five entries, the most resistant based on antixenosis, had only one puncture per pod. Twelve entries had 11 or more punctures/pod, showing the highest preference, or the most susceptible.

Few entries expressed antibiosis as reflected in average weights of larvae recovered as they exited pods to pupate. Average larval weight for more than 85% of the entries was above 7 mg, the most frequent class being 7.5mg. When comparing the rankings for larval weight and larval mortality there does not appear to be a relationship between the two, with one exception. PI 189378 is among those lines with low larval weight and high mortality (29.2%). Only 11 lines (3.8% of the entries) had greater than 25% mortality. The highest mortality was 35% in two lines, PI 165493 and IT 82E-32.

Among the lines ranking in the curculio resistant group which had very low numbers of exit holes per pod puncture were PI 175959, Bambey-5, N'Diambour, 83S-899, PI 255815, UCR 202, AU85-CCR-20, UCR 200, UCR 191, and Freezegreen. In most cases lines showing low numbers of exit holes per pod puncture resulted from the adults' repeated attempts to feed and/or oviposit, resulting in large numbers of pod punctures, but with limited successful oviposition or larval survival.

Pod strength contributes to pod-factor resistance. Pod strength of entries in this evaluation ranged from a high of 0.47 kg to a low of 0.07 kg. Our resistant check, Freezegreen, known

to have pod-factor resistance was in the upper 33% of the entries with pod strength of 0.28 kg. The known susceptible, California Blackeye No. 5 had a pod strength of 0.19. The three entries with the highest pod strength were PI 293467, PI 293468, and PI 293514, measuring 0.47, 0.46, and 0.46 kg, respectively. These entries were derived from either of two heirloom varieties known to be resistant to cowpea curculio: Brabham and Groit.

Approximately 77% of the entries sustained from 20 to 40% seed damage from curculio. IT82-D 713, BBR 42 (UCR 194), and MN 150 had the lowest percent seed 0.03, 0.04, and 0.06, respectively. Other entries which had losses of less than 10% were (ranked in order): PI 189374, TVu 3046, BBR 23 (UCR 189), 24-1A (UCR 200), CPI 30783, PI 218122, PI 353074, UCR 240 (754), AND AU 85 CCR-20. The entries sustaining the most seed damage (64-70%) from curculio were: Bambey-21, IT 88DM-361, IT 82E-56, 87D784-1, and IT 82E-41.

Pod bug resistance

Resistance to pod bugs was evaluated, in part, from percent sound pods in the field. Pod bug resistant check lines produced approximately 90% or greater sound pods. The best southern green stink bug resistant check, PI 293476 produced almost 96% sound pods; the pod bug resistant check, TVu-1890 produced 94% sound pods. Three entries, PI 194207, CPI-30783, and TVu 354, ranked higher than the best check, producing 96, 97, and 99% sound pods, respectively. Among curculio resistant lines, PI's 142779, 175959, 293468, and N'Diambour had 90% or more sound pods. High pod strength appears to contribute to pod bug resistance. The resistant check lines TVu 1890, PI 293476, and PI 293557 tested 0.36, 0.27, 0.27, and 0.26 kg, respectively for pod strength.

Ninety-one percent of the entries sustained 30% or less seed damage from pod bugs. The curculio resistant lines, GUJ-1 (UCR 168), Bambey-5, PI 218122, TVu 3046, PI 353074, and UCR 202 were among those with 20% or less pod bug-damaged seeds.

Scoring for resistance to pod insects

Percentage sound seed is an over-all measure of performance in the field environment, subjected to both biotic and abiotic stress. About 74% of the entries produced 50-80% sound seed. The curculio and pod bug resistant checks were not among the lines having greater than eighty percent sound seed. Lines ranking above this level are potential sources of higher levels of resistance to insect pests (and perhaps abiotic stress).

Criteria for evaluating the germplasm were used as components in calculating a resistance score to identify entries with the most resistance to cowpea curculio and pod bugs. Entries were listed in order from most desirable to least

desirable, based on the contribution to resistance to pod insects, for measured and calculated variables. Variables were given a value of 1 or 3 points. Exit holes in 25-pod sample, exit holes in 10-pod sample, percentage of sound seed, and percentage of seed not damaged by cowpea curculio were assigned three points each. One point was assigned to the remaining variables: exit holes per puncture, punctures per exit hole, curculio damaged seed per puncture, percentage of sound pods in the field, Instron force, and larval weight. The top twenty-five entries (almost a 10% selection intensity) listed for each variable received the number of points assigned to each variable. The score for resistance to pod insects is the sum of the points across all variables for each of the top twenty-five entries. Because some entries had the same resistance score the top twenty-eight entries, ranging from a high score of 14 down to 6, can be considered to have potential for use in breeding programs to improve insect resistance (Table 3).

PUBLICATIONS

CHAMBLISS, O.L. AND HUNTER, A.G. 1993. Evaluation of *Vigna unguiculata* germplasm for insect resistance. Hortscience 28:456. (Abstract)

CHAMBLISS, O.L. AND HUNTER, A.G. 1995. Selecting *Vigna unguiculata* germplasm for resistance to cowpea curculio and other pod-damaging insects. Hortscience 30:443. (Abstract)

CHAMBLISS, O.L. AND HUNTER, A.G. 1995. *Vigna unguiculata* germplasm evaluated for insect resistance. Proceeding of Second World Cowpea Congress. (Submitted for publication.)

Table 1. Controls used in evaluation of *Vigna unguiculata* germplasm for resistance to cowpea curculio and pod bugs, Headland, Alabama, U.S.A., 1992.

<u>Variety/line</u>	<u>Reported resistance/susceptibility</u>				
AU85-CCR-20	Cowpea curculio resistant				
Freezegreen	"	"	"		
CR-17-1-13	"	"	"		
CR-18-13-1	"	"	"		
CR-22-2-21	"	"	"		
PI 255815	"	"	"		
PI 343449	"	"		susceptible	
Calif.Blackeye No. 5	"	"	"		
TARS 36	"	"	"		
IT 81D-1137	Cowpea weevil resistant				
IT 84D-449	"	"	"		
IT 84D-460	"	"	"		
IT 86-472	"	"	"		
IT 86D-534	"	"	"		
IT 86D-641	"	"	"		
PI 293476	Southern green stink bug resistant				
PI 293557	"	"	"	"	"
PI 293570	"	"	"	"	"
TVu 1890	Pod sucking bug resistant				
VYA	"	"	"	susceptible	

Table 2. Evaluation of *Vigna unguiculata* germplasm: resistance to cowpea curculio, Auburn University, Alabama, 1992-94.

Key to descriptors used in Table 1.

OBS	Observation number.
ENTRY	Identification of material observed.
DAYSMT	Number of days from planting to harvest.
SOUNDPOD	Percentage of pods attaining early mature green stage.
AVGLARWT	Mean weight (g) of larvae recovered from mature, dry pods.
PERCDEAD	Percentage of dead larvae recovered from mature, dry pods
AVGPODWT	Mean weight (g) of mature, dry pods.
AVGPODLH	Mean pod length (cm) of mature, dry pods.
AVGSEEW	Mean weight (g) of 100 dry seeds.
PERSOUSE	Percentage of mature, dry seed not damaged by cowpea curculio or pod bugs.
PUNCPD	Mean adult cowpea curculio punctures per pod.
EXHOLPD	Mean number of cowpea curculio larval exit holes per pod.
HOLEPUNC	Mean percentage of cowpea curculio punctures per pod resulting in larval exit holes.
INSTRON	Mean force (g/sq mm) required to puncture dry pods using a 1 mm diameter probe on an Instron test machine with a 500 kg load cell.

TABLE 2. EVALUATION OF *Vigna unguiculata* GERMPLASM: RESISTANCE TO COWPEA CURCULIO

O B S	E N T R Y	D S A P A A A P P E H I A O V E V V V E U X O L N Y N L C P P S S N O E S S D A D O O E O C L P T M P R E D D E U P P U R A O W A W L W S O O N O T D T D T H T E D D C N											
1	IT 86D-792	71	69	6.8	18	1.8	16.5	15	45	5	1.2	0.54	32
2	87D-939-1	109	85	6.9	0	1.4	15.2	9	55	6	0.5	0.05	41
3	87D-829-5	98	67	7.0	23	1.6	14.8	13	19	5	0.5	0.26	48
4	87D-1951	77	73	7.1	2	1.5	13.7	13	61	4	0.5	0.17	42
5	86D-1010	95	52	4.9	0	1.4	15.9	12	46	8	0.2	0.06	88
6	87D-611-3	95	83	6.4	2	1.6	18.2	8	29	13	0.2	0.05	69
7	87D-784-1	109	51	7.4	4	1.4	15.6	17	10	10	0.5	0.12	36
8	86D-400	68	81	7.9	16	2.1	17.8	13	57	3	0.8	0.39	36
9	86D-534	68	80	7.7	18	1.6	17.4	13	65	3	0.5	0.26	54
10	87D-879-1	71	86	7.7	2	2.1	18.2	13	77	4	0.6	0.17	53
11	87D-378-4	109	57	7.8	0	1.3	14.4	15	32	13	0.7	0.14	43
12	87S-1332	71	85	7.3	16	1.4	14.9	14	64	3	0.7	0.26	33
13	87D-1627	109	73	7.8	6	2.2	17.1	16	30	18	0.2	0.06	51
14	86D-715	68	71	8.6	7	1.4	12.7	12	53	4	0.2	0.17	57
15	86D-957	68	82	7.4	5	1.3	14.0	11	68	3	0.4	0.15	55
16	89KD-792	109	25	7.9	3	1.8	12.8	17	9	3	0.9	0.45	43
17	87D-885	71	79	7.5	15	2.7	17.8	17	40	4	0.7	0.31	58
18	87D-697-2	95	71	8.5	0	1.6	14.4	15	41	8	0.7	0.25	51
19	86D-444	68	81	7.3	6	2.0	16.1	15	66	2	0.2	0.04	43
20	87D-2075	85	78	7.8	13	1.2	15.6	10	45	5	0.4	0.14	58
21	IT88DM-361	109	77	6.4	0	1.3	11.4	12	19	5	0.5	0.11	55
22	88DM-363	.	.	.	.	.	.	.	.	.	.	.	.
23	86D-719	86	72	7.0	8	2.0	14.0	9	47	8	0.3	0.05	73
24	87D-590-5	85	69	7.3	7	1.7	15.6	13	29	6	0.4	0.18	78
25	87D-670-2	100	56	6.4	0	1.2	13.7	12	38	7	0.3	0.16	48
26	84S-2246-4	104	66	7.4	11	1.7	15.2	12	35	6	0.6	0.18	61
27	TVX-1948-OIF	77	93	7.6	11	2.0	16.1	7	57	9	0.3	0.06	87
28	87D-453-2	79	84	7.7	13	2.1	17.8	9	73	8	0.5	0.05	123
29	87D-1931	71	85	7.4	6	1.9	18.7	10	65	7	0.4	0.09	84
30	87D-551-1	68	83	8.3	12	3.1	22.0	14	60	6	1.1	0.28	41
31	85D-8850-2	77	91	7.3	6	2.0	17.8	13	43	5	0.2	0.16	89
32	86D-721	109	78	7.3	8	1.9	14.9	15	13	8	0.7	0.28	62
33	TVX-3236	77	80	8.1	7	1.4	13.0	10	54	3	0.2	0.51	36
34	85F-958	74	90	8.0	6	1.5	15.0	9	51	5	0.4	0.11	107
35	87D-555-6	109	72	7.4	19	1.7	17.1	14	27	9	0.6	0.09	40
36	87D-272	.	.	.	.	1.4	17.8	.	.	.	0.2	.	.
37	84D-449	68	71	8.2	0	1.8	15.7	16	60	3	0.6	0.47	42
38	IFE BROWN	71	66	7.9	5	1.4	12.7	12	80	2	0.4	0.59	39
39	85F-2687	95	53	6.6	0	1.8	16.2	11	29	9	0.2	0.06	90
40	84D-448	73	81	7.6	12	1.4	15.2	12	49	3	0.4	0.32	36
41	83S-818	104	52	5.9	3	1.7	16.8	14	28	12	0.5	0.05	54
42	83D-442	73	91	7.6	4	2.4	19.1	12	76	6	0.3	0.05	95
43	85F-2805	66	72	7.7	6	1.0	12.1	9	80	1	0.6	0.48	40
44	85F-3139	61	68	8.4	0	1.2	14.8	12	63	2	0.5	0.53	31
45	82D-889	66	87	8.1	7	2.5	19.7	12	64	7	0.8	0.19	93
46	81D-1137	77	73	7.3	19	1.9	14.0	18	51	7	0.6	0.13	42
47	82E-16	68	95	8.3	20	2.5	18.4	11	72	7	0.5	0.06	101
48	84S-2135	68	74	7.7	13	2.2	15.2	15	79	3	0.3	0.26	41
49	85F-867-5	65	92	7.9	8	1.5	16.5	10	64	8	0.2	0.15	63
50	83S-872	95	71	6.4	11	1.4	15.9	9	53	6	0.3	0.05	114
51	85F-1380	68	94	7.7	6	1.8	18.2	10	81	3	0.3	0.28	69

TABLE 2. EVALUATION OF *Vigna unguiculata* GERMPLASM: RESISTANCE TO COWPEA CURCULIO

OBS	ENTRY	DAYS TO MATURITY	SEED YIELD (g/m ²)	PLANT HEIGHT (cm)	LEAF AREA (cm ²)	ROOT DRY WEIGHT (g/plant)	STEM DRY WEIGHT (g/plant)	LEAF DRY WEIGHT (g/plant)	ROOT:STEM RATIO	LEAF:STEM RATIO	STEM:LEAF RATIO	ROOT:LEAF RATIO	STEM:LEAF RATIO
52	SUVITA-2	.	.	.	.	.	.	.	.	.	.	.	.
53	89KD-434	68	87	7.5	13	1.8	14.9	14	48	3	0.5	0.91	45
54	IT81-D-985	.	.	.	.	.	.	.	.	.	.	.	.
55	89KD-260	.	.	.	.	.	.	.	.	.	.	.	.
56	IT90K-76	109	49	7.3	0	1.6	14.8	14	22	4	0.7	0.28	56
57	88D-867-11	109	58	7.5	0	1.7	11.4	15	58	4	0.3	0.18	.
58	86D-742	68	75	7.4	8	2.0	17.1	14	59	3	0.6	0.25	50
59	82D-849	68	79	7.9	13	2.2	17.4	15	42	4	0.9	0.46	89
60	TVX-3236, sus/	76	75	7.5	5	1.3	13.0	10	75	2	0.4	0.28	47
61	84D-666	63	79	7.8	9	.	.	12	54	4	.	0.25	83
62	86D-534	68	82	7.4	27	1.9	17.1	13	61	4	0.7	0.37	43
63	IT81D-994	.	.	.	.	.	.	.	.	.	.	.	.
64	B-301	102	86	7.4	9	1.3	12.7	22	36	8	0.3	0.06	77
65	IT90K-59	.	.	7.4	0	1.3	15.2	13	10	11	0.6	0.10	60
66	89KD-374	.	.	.	.	.	.	.	.	.	.	.	.
67	86D-371	.	.	7.5	0	0.9	14.0	22	19	12	1.2	0.06	49
68	89KD-245	.	.	.	.	.	.	.	.	.	.	.	.
69	IT89KD-107	.	.	7.3	18	1.5	14.8	14	51	2	0.4	0.17	38
70	IT90K-77	.	.	7.0	0	1.4	12.7	14	27	5	0.6	0.12	58
71	IT81D-1228-14	77	77	7.0	3	1.8	21.6	15	58	3	0.1	0.20	51
72	86F-2014-1	68	76	7.5	12	1.5	17.8	10	70	4	0.5	0.21	56
73	83S-899	74	84	6.8	0	1.9	23.8	16	74	7	0.2	0.04	32
74	84E-116	71	83	7.0	8	1.7	23.3	12	48	3	0.4	0.26	44
75	83S-911	68	87	8.0	7	1.6	21.6	33	88	4	0.5	0.06	.
76	83S-898	71	79	7.8	5	2.0	21.6	12	68	3	0.4	0.24	19
77	86F-2062-5	68	78	7.4	0	2.1	23.5	10	88	1	0.3	0.25	21
78	86F-2089-5	66	82	7.5	14	2.0	22.4	10	58	9	0.7	0.15	33
79	86D-880	63	82	7.4	12	2.2	22.0	14	72	3	0.4	0.27	33
80	C.B.E. #5	88	71	6.7	0	1.5	15.2	16	54	6	0.5	0.25	53
81	UCR54, BAMBEY-12	63	63	7.1	7	1.4	14.0	12	83	2	0.3	0.22	21
82	UCR55, BAMBEY-21	109	66	7.2	12	1.7	16.9	15	14	6	0.9	0.25	42
83	UCR59, BAMBEY-26	95	73	6.1	4	1.5	16.5	14	34	10	0.3	0.08	70
84	UCR63, BAMBEY-23	82	68	7.2	2	1.5	14.9	16	59	4	0.4	0.17	51
85	UCR74, VITA-5	82	82	6.4	0	1.6	15.2	9	67	3	0.1	0.07	64
86	UCR84, TVU-984	71	93	7.6	7	1.7	16.9	7	71	3	0.2	0.12	98
87	UCR90, TVU-3046	77	79	7.3	0	0.8	11.9	6	84	1	0.1	0.17	88
88	UCR106, TVU-4552	68	70	7.8	11	1.9	16.2	14	71	2	0.2	0.32	21
89	UCR107, TVX-12-01E	88	74	7.2	0	1.5	14.2	7	48	4	0.2	0.08	88
90	UCR124, C-779	71	94	7.6	6	1.5	14.9	8	62	4	0.3	0.16	76
91	UCR125, C-152	74	86	7.6	0	1.3	14.4	9	70	4	0.4	0.15	90
92	UCR139, TVU-1537	88	68	6.5	8	1.0	12.3	8	58	4	0.4	0.60	75
93	UCR140, CPI-45583	79	63	7.2	5	1.4	13.3	12	79	4	0.4	0.17	54
94	UCR141, TVU-42	74	75	7.5	7	1.7	13.7	11	59	5	0.2	0.12	96
95	UCR142, VITA-4	88	76	7.0	3	1.4	12.7	11	45	4	0.2	0.15	70
96	UCR146, TVU-354	77	96	7.4	13	2.0	16.8	9	72	6	0.8	0.19	102
97	UCR147, CPI-30783	68	97	8.1	13	2.1	16.8	10	89	3	0.4	0.22	86
98	UCR150, TVU-72	74	90	8.1	8	1.9	15.6	8	66	6	0.5	0.17	92
99	UCR168, N'DIAMBOUR	77	90	7.5	0	1.5	15.9	14	65	6	0.1	0.03	36
100	UCR171, L-496	84	88	6.5	13	1.2	13.1	9	22	6	0.3	0.15	47
101	UCR172, YORIMUMI	101	61	6.9	0	1.3	14.4	11	43	5	0.4	0.21	56
102	UCR173, L-460	81	85	6.9	0	1.5	15.9	9	39	4	0.2	0.07	64

TABLE 2. EVALUATION OF *Vigna unguiculata* GERMPLASM: RESISTANCE TO COWPEA CURCULIO

OBS	ENTRY		DAYS	SUN	AVG	PERC	AVG	AVG	AVG	PERC	PURCH	EACH	HOURS	INNS
			START	END	WTD	WTD	WTD	WTD	WTD	WTD	WTD	WTD	WTD	WTD
103	UCR176,	TVX-1193-7D	96	74	6.6	18	1.6	15.6	9	34	6	0.3	0.19	41
104	UCR179,	TVX-309-1G	77	86	8.6	18	1.4	12.3	9	66	4	0.1	0.09	101
105	UCR182,	4R-O267-1F	68	88	7.9	26	1.2	13.7	7	57	2	0.2	0.44	67
106	UCR186,	25-3-2	68	87	7.2	8	2.2	17.8	11	70	4	0.3	0.14	67
107	UCR187,	25-13-1	68	91	7.6	27	1.9	18.2	11	56	6	0.5	0.09	64
108	UCR189,	BBR-23	61	72	7.3	0	1.4	18.6	6	84	1	0.6	0.43	61
109	UCR191,	BBR-25A	60	76	7.8	9	2.2	20.3	12	78	4	0.0	0.07	72
110	UCR193,	BBR-37	61	81	7.4	7	1.8	18.4	.	.	.	0.6	.	.
111	UCR194,	BBR-42	58	73	5.8	0	1.5	17.8	9	88	3	0.4	0.03	6
112	UCR195,	BBR-76	68	82	7.6	8	2.1	19.1	11	54	5	1.0	0.25	65
113	UCR196,	GUJ-1	66	78	6.8	14	0.9	15.2	9	81	4	0.1	0.16	18
114	UCR197,	CHARODI	77	77	6.6	0	0.9	11.1	6	78	1	0.1	0.07	66
115	UCR199,	P3-1	91	81	7.2	0	1.0	14.0	7	40	7	0.3	0.08	56
116	UCR200,	24-1A	68	73	7.4	0	0.8	13.3	5	80	2	0.1	0.06	30
117	UCR201,	460-1-1	62	76	8.0	0	1.3	18.6	8	69	3	0.7	0.40	34
118	UCR202,	BROWN SEED	66	74	7.3	8	1.2	14.4	7	87	2	0.2	0.05	36
119	UCR205,	868	67	81	7.0	14	2.3	18.4	11	74	2	0.2	0.21	31
120	UCR206,	1552	58	73	7.8	12	1.4	17.8	8	75	4	0.2	0.17	24
121	UCR210,	78-37	68	76	7.6	0	1.5	16.5	8	74	2	0.4	0.36	30
122	UCR212,	BAMBEY-5	77	72	7.6	0	2.1	17.5	12	81	5	0.1	0.03	62
123	UCR213,	66-54	82	76	7.4	21	1.8	15.9	18	60	6	0.6	0.11	36
124	UCR216,	TVX-323601G	71	79	7.7	15	1.4	12.7	10	55	3	0.5	0.54	45
125	UCR221,	IT81D-1007	100	61	5.7	0	2.1	21.0	11	36	9	0.3	0.04	87
126	UCR222,	IT81D-1020	95	76	6.0	10	1.1	14.3	7	48	6	0.4	0.15	91
127	UCR226,	IT81D-1064	100	70	6.8	3	1.6	16.3	15	39	8	0.7	0.11	52
128	UCR232,	IT82E-18	68	76	7.8	21	2.2	19.1	15	67	3	0.6	0.37	37
129	UCR236,	CROSS 1-6E-1	57	75	8.1	.	1.4	13.5	10	50	3	0.7	0.49	38
130	UCR237,	CROSS 1-6E-2	95	83	7.0	0	1.6	19.5	12	19	17	0.3	0.02	120
131	UCR238,	TKX133-16D-1	66	84	7.6	12	1.5	15.9	9	54	4	0.6	0.29	43
132	UCR239,	TKX133-16D-2	68	95	8.1	7	1.8	18.1	6	74	4	0.3	0.29	115
133	UCR240,	754	66	79	6.9	4	1.2	17.8	11	90	1	0.4	0.26	17
134	UCR245,	TVX1836-013J	65	81	7.6	18	2.1	20.7	20	39	5	0.6	0.23	50
135	UCR248,	QUARENTA DIAS	77	93	7.7	18	1.8	16.2	12	45	10	0.4	0.07	77
136	UCR261,	MALU	68	95	7.9	7	2.1	14.9	7	75	4	0.4	0.15	99
137	UCR264,	POPULATION 736	79	77	7.6	7	1.3	12.3	12	68	4	0.3	0.18	47
138	UCR287,	IT82D-716	68	61	7.8	9	1.1	13.0	10	59	3	0.3	0.20	36
139	UCR291,	IT82D-744	68	90	8.3	14	1.6	16.3	12	73	4	0.3	0.14	41
140	UCR294,	IT82E-49	81	88	7.2	0	1.9	17.8	15	58	3	0.6	0.23	54
141	UCR299,	IT82D-709	71	62	7.5	6	1.3	13.3	13	34	5	0.6	0.26	34
142	UCR301,	IT82D-25	109	73	7.3	5	1.5	13.1	10	27	6	0.8	0.32	46
143	UCR304,	IT82D-752	68	75	8.1	6	2.0	16.5	10	61	3	0.4	0.23	97
144	UCR305,	IT82E-70	79	88	7.7	23	2.1	17.1	14	60	4	0.6	0.43	52
145	UCR306,	IT82D-713	68	71	8.1	5	1.6	13.0	10	87	2	0.1	0.07	42
146	UCR311,	IT82D-789	66	85	7.4	4	2.2	18.1	13	67	2	0.5	0.26	49
147	UCR313,	IT82D-885	82	89	7.2	11	1.7	15.9	9	62	5	0.4	0.14	103
148	UCR314,	IT82D-889	58	81	7.9	0	2.1	20.3	10	48	5	0.8	0.24	70
149	UCR315,	IT82E-9	57	77	8.7	.	2.0	14.0	13	69	3	0.8	0.72	51
150	UCR316,	IT82E-13	68	93	8.3	10	2.4	20.0	14	58	4	0.2	0.10	77
151	UCR317,	IT82E-16	68	94	8.1	23	2.3	17.8	11	74	4	0.6	0.17	99
152	UCR319,	IT82E-41	.	.	.	.	1.0	14.0	.	0	3	1.0	0.36	40
153	UCR320,	IT82E-56	95	81	6.9	11	1.7	14.6	12	25	9	0.6	0.17	50

TABLE 2. EVALUATION OF *Vigna unguiculata* GERMPLASM: RESISTANCE TO COWPEA CURCULIO

OBS	E	N	T	R	Y	D	S	A	P	A	A	A	P	P	E	H	I
							O	V	E	V	V	V	E	U	X	O	N
S	Y					T	A	U	G	R	G	G	R	S	O	L	S
							M	P	R	E	D	E	U	P	P	U	R
							A	O	W	A	W	L	W	S	O	N	O
							T	D	T	D	T	H	T	E	D	C	N
154	UCR321,	IT82E-32	95	86	6.9	35	1.2	16.9	11	21	9	0.3	0.04	112			
155	UCR331,	IT82D-703	74	84	7.1	16	1.3	14.4	13	63	4	0.4	0.11	51			
156	UCR334,	IT82D-380-5	68	76	7.5	9	1.2	17.8	9	82	2	0.3	0.21	37			
157	UCR338,	IT81D-1228-16	97	64	7.2	6	1.3	14.0	14	41	6	0.7	0.46	57			
158	UCR341,	IT81D-1228-10	71	91	7.9	31	2.8	16.9	14	68	3	0.5	0.36	68			
159	UCR343,	YLCC-784	95	66	7.4	0	1.5	15.9	11	28	5	0.3	0.20	53			
160	UCR347,	MN-150	67	89	8.0	0	1.7	16.2	13	83	1	0.3	0.32	50			
161	UCR364,	BOTSWANA-255	95	63	.	.	.	.	.	.	.	.	.	.	.	.	.
162	UCR371,	EMMA 60	109	85	6.8	16	1.9	12.7	12	42	5	0.3	0.16	71			
163	UCR374,	ICV-8	68	76	7.3	4	1.4	13.5	7	52	3	0.4	0.40	73			
164	UCR377,	ICV-11	71	92	7.5	13	2.1	19.1	9	52	7	0.4	0.08	73			
165	UCR391,	IT82D-875	85	84	6.4	34	1.6	16.5	9	53	7	0.3	0.04	118			
166	UCR395,	IT83D-356-1	68	87	8.1	13	2.1	18.1	15	49	9	0.4	0.09	62			
167	UCR397,	IT83D-666	58	82	7.7	0	2.6	15.9	16	75	2	0.3	0.15	122			
168	UCR398,	IT83S-680-9	68	93	7.7	11	1.9	16.8	13	67	5	0.5	0.27	65			
169	UCR400,	IT83S-720-2	57	87	8.5	.	2.5	19.7	12	50	5	0.5	0.24	80			
170	UCR401,	IT83S-725-18	61	91	8.7	14	2.1	16.5	12	49	3	0.6	0.30	60			
171	UCR402,	IT83S-728-5	68	70	7.6	4	1.6	16.9	13	55	3	0.7	0.41	47			
172	UCR403,	IT83S-728-13	66	82	7.8	8	1.9	15.9	11	77	3	0.5	0.25	34			
173	UCR404,	IT83S-742-1	61	75	7.8	0	1.6	16.5	9	71	3	0.4	0.21	41			
174	UCR405,	IT83S-742-5	57	76	7.9	.	1.9	17.8	10	48	3	0.4	0.35	39			
175	UCR408,	IT83S-797	68	81	7.7	12	2.0	13.5	15	58	4	0.3	0.26	42			
176	UCR411,	IT83S-872	95	75	5.8	4	1.3	15.9	9	23	7	0.4	0.23	80			
177	UCR417,	IT83S-911	68	73	7.7	16	1.5	21.6	14	56	3	0.5	0.36	39			
178	UCR420,	IT84E-124	62	69	7.5	7	1.7	16.2	13	73	3	0.3	0.31	28			
179	UCR430,	IT84S-2049	91	89	6.2	0	1.6	15.9	11	43	7	0.3	0.12	126			
180	UCR437,	IT84S-2246	109	60	7.2	5	1.9	15.2	14	32	7	0.8	0.16	66			
181	AU91P1 =	Freezegreen	74	84	6.8	17	1.6	14.5	8	60	6	0.2	0.07	73			
182	AU91P2 =	CR-22-2-21	85	68	6.4	3	0.8	11.4	6	70	3	0.2	0.14	64			
183	AU91P3 =	85-CCR-20	68	87	7.6	0	1.1	10.6	6	73	2	0.1	0.05	67			
184	AU91P4 =	CR-17-1-13	68	87	6.9	0	1.8	14.4	10	63	4	0.3	0.24	51			
185	AU91P5 =	CR-18-13-1	68	81	7.2	18	1.4	12.1	6	74	3	0.2	0.24	68			
186	AU91P6 =	CR-221	100	81	6.1	0	1.1	15.2	7	38	6	0.3	0.18	85			
187	AU91P7 =	PI 293476	84	95	6.9	14	1.9	13.0	41	54	4	0.5	0.14	71			
188	AU91P8 =	PI 293557	82	91	7.5	1	1.6	17.1	10	64	5	0.3	0.18	66			
189	AU91P9 =	PI 293570	71	89	7.2	12	2.2	18.2	21	63	3	0.7	0.24	70			
190	AU91P10 =	PI 343449	109	63	6.4	0	1.4	14.6	10	6	5	0.8	0.33	57			
191	AU91P11 =	IT 81D-1137	76	80	7.6	7	2.0	15.6	15	64	4	0.2	0.08	57			
192	AU91P12 =	IT 84D-449	68	84	7.8	13	1.6	15.2	16	39	2	0.3	0.32	30			
193	AU91P13 =	IT 84D-460	77	70	7.2	1	1.2	11.7	12	65	4	0.2	0.21	37			
194	AU91P14 =	IT 86-472	68	75	6.3	20	1.7	17.8	14	66	4	0.4	0.19	54			
195	AU91P15 =	IT 86D-534	68	77	6.8	0	2.2	16.5	14	72	3	0.3	0.56	45			
196	AU91P16 =	IT 86D-641	68	83	8.1	8	2.3	21.3	12	58	6	0.6	0.14	45			
197	AU91P17 =	TARS 36	102	69	6.8	13	1.9	17.5	16	23	10	0.8	0.15	66			
198	AU91P18 =	TVu 1890	71	94	7.1	0	1.9	17.4	14	76	2	0.3	0.84	94			
199	AU91P20 =	VYA	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
200	PI 190191		74	79	7.4	10	1.5	15.7	12	60	5	0.2	0.08	92			
201	PI 353074		63	76	7.1	9	1.9	26.7	9	87	3	0.1	0.31	24			
202	PI 354580		84	89	6.7	17	2.0	16.9	11	68	4	0.9	0.17	.			
203	PI 291384		79	91	6.6	20	1.3	19.1	7	59	7	0.4	0.09	55			
204	PI 291385		74	85	7.8	4	1.7	23.5	.	.	.	0.4	.	.			

TABLE 2. EVALUATION OF *Vigna unguiculata* GERMPLASM: RESISTANCE TO COWPEA CURCULIO

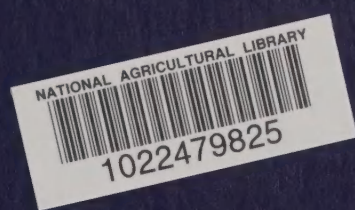
OBS	ENTRY	DAYS TO MATURITY	SEED YIELD (g/m ²)	PLANT HEIGHT (cm)	ROOT DRY WEIGHT (g/plant)	STEM DRY WEIGHT (g/plant)	LEAF DRY WEIGHT (g/plant)	ROOT:STEM:LEAF RATIO	SEED DRY WEIGHT (g/100 seeds)	SEED YIELD (g/m ²)	PLANT HEIGHT (cm)	ROOT DRY WEIGHT (g/plant)	STEM DRY WEIGHT (g/plant)	LEAF DRY WEIGHT (g/plant)
205	PI 115674	85	77	6.2	0	1.3	16.8	10	63	6	0.4	0.11	68	
206	PI 115679	77	85	7.1	0	1.2	17.8	7	80	5	0.3	0.03	68	
207	PI 115681	86	93	6.8	0	1.2	18.7	7	50	7	0.5	0.10	72	
208	PI 121433	77	85	7.1	2	1.5	15.6	9	46	6	0.4	0.10	106	
209	PI 124609	82	84	7.3	9	1.5	16.2	13	54	4	0.4	0.09	92	
210	PI 141355	85	84	6.7	0	1.4	15.2	14	40	8	0.2	0.05	78	
211	PI 142779	77	93	7.8	8	1.6	14.3	8	76	5	0.1	0.06	116	
212	PI 145198	79	86	6.9	0	1.7	14.9	6	79	4	0.2	0.03	92	
213	PI 147077	74	91	7.6	9	2.6	21.6	13	63	10	0.3	0.03	69	
214	PI 148674	77	85	7.1	18	1.9	16.0	9	66	5	0.1	0.06	110	
215	PI 148678	95	79	6.6	25	2.0	16.5	9	18	12	0.4	0.10	98	
216	PI 148681	83	88	7.2	0	1.6	15.2	12	40	7	0.4	0.16	60	
217	PI 151562	90	94	5.7	0	1.2	13.1	8	61	4	0.3	0.18	78	
218	PI 152194	84	83	7.4	20	1.8	16.5	10	68	6	0.2	0.08	92	
219	PI 152195	81	92	7.3	0	2.7	19.1	14	75	10	0.5	0.04	91	
220	PI 152196	77	86	7.5	13	1.9	16.5	12	61	5	0.2	0.18	89	
221	PI 152197	74	93	8.0	15	2.1	18.7	11	71	5	0.5	0.18	98	
222	PI 152199	77	95	7.4	15	2.2	18.4	9	66	5	0.8	0.19	114	
223	PI 154134	86	79	6.6	12	1.4	15.0	7	59	7	0.5	0.15	77	
224	PI 163142	85	90	6.4	7	1.5	15.6	11	54	8	0.2	0.05	100	
225	PI 163143	79	87	7.2	0	1.7	16.5	12	56	4	0.4	0.25	58	
226	PI 163448	86	90	6.9	5	1.7	16.5	10	49	9	0.6	0.06	99	
227	PI 165493	92	75	6.3	35	1.5	16.2	9	57	5	0.3	0.09	77	
228	PI 165941	77	91	7.3	8	2.1	17.1	11	72	5	0.3	0.16	74	
229	PI 167024	102	32	7.6	0	1.0	12.7	13	30	6	0.4	0.33	44	
230	PI 170859	.	.	.	.	0.3	10.2	.	.	.	0.0	.	.	
231	PI 170861	85	85	6.5	17	1.4	16.5	8	51	8	0.4	0.08	108	
232	PI 170865	79	82	6.7	23	1.4	15.6	7	49	6	0.5	0.14	81	
233	PI 170869	109	59	6.4	0	1.2	15.2	9	50	4	0.6	0.07	64	
234	PI 171891	90	71	7.5	10	1.6	15.9	11	52	6	0.3	0.09	79	
235	PI 173165	.	.	5.7	0	0.7	12.7	7	80	2	0.3	0.32	19	
236	PI 173827	77	80	7.3	10	1.9	15.8	9	67	7	0.1	0.10	97	
237	PI 174411	84	83	7.3	0	1.2	12.7	8	45	6	1.0	0.15	48	
238	PI 175327	84	85	6.6	4	0.9	13.0	7	37	5	0.2	0.07	77	
239	PI 175332	109	48	6.0	11	1.5	15.2	15	4	5	0.2	0.22	61	
240	PI 175959	77	93	7.4	2	1.9	15.6	9	55	8	0.2	0.01	96	
241	PI 175963	73	80	7.1	0	1.7	14.0	13	58	3	0.4	0.38	56	
242	PI 176796	84	77	6.8	12	0.9	13.0	9	40	5	0.5	0.16	44	
243	PI 177101	84	77	7.4	0	0.9	14.0	8	69	3	0.3	0.07	.	
244	PI 177579	88	81	5.8	0	1.5	15.6	8	68	10	0.2	0.52	100	
245	PI 179554	95	62	6.0	0	1.2	12.7	12	40	5	0.7	0.18	54	
246	PI 183251	74	89	7.5	5	2.1	17.1	16	54	5	0.3	0.11	55	
247	PI 185647	79	78	7.3	3	1.8	15.2	7	53	11	0.3	0.02	92	
248	PI 186386	83	80	6.6	1	1.7	16.5	8	55	9	0.2	0.04	117	
249	PI 186460	71	84	8.0	3	1.1	13.0	8	60	5	0.8	0.20	63	
250	PI 186465	95	85	.	.	1.1	15.2	.	.	.	0.1	.	.	
251	PI 189230	77	91	7.0	0	1.7	15.7	9	63	5	0.2	0.58	71	
252	PI 189374	68	91	7.6	13	1.1	12.7	7	84	1	0.2	0.24	82	
253	PI 189378	104	64	5.6	29	1.2	14.3	11	31	10	0.4	0.10	42	
254	PI 194206	79	91	7.3	5	1.3	15.2	10	61	3	0.4	0.15	86	
255	PI 194207	77	99	6.9	8	1.3	15.0	9	68	6	0.3	0.05	92	

TABLE 2. EVALUATION OF *Vigna unguiculata* GERMPLASM: RESISTANCE TO COWPEA CURCULIO

O B S	E N T R Y		D	S	A	P	A	A	A	P		E	H	I
			A Y S M A T	O U N D O D	V G L A R W T	E R C D E A D	V G P O D W T	V G P O D L H	V G S E E W T	E R S O U S E	P U N C P O D	X H O L P O D	O L P U N C	
256	PI 194208	71	86	7.4	11	1.7	15.9	9	68	5	0.4	0.10	78	
257	PI 194210	83	82	6.2	5	1.1	11.7	6	65	4	0.3	0.10	110	
258	PI 200867	71	91	7.8	16	2.0	17.8	10	68	5	0.6	0.22	98	
259	PI 205141	77	88	7.9	5	2.4	14.0	15	64	7	0.6	0.15	55	
260	PI 205240	90	78	5.6	0	1.1	11.0	12	19	6	0.5	0.30	53	
261	PI 207527	81	87	7.0	11	0.9	13.7	7	60	3	0.5	0.33	88	
262	PI 208771	83	82	7.7	2	1.4	16.5	9	54	8	0.5	0.06	71	
263	PI 208845	88	88	7.3	33	2.4	19.1	12	60	6	0.4	0.11	63	
264	PI 209971	68	88	7.4	7	1.4	13.7	10	60	3	0.9	0.34	69	
265	PI 211109	95	84	5.3	0	1.3	14.0	8	33	6	0.7	0.17	55	
266	PI 211110	.	.	.	.	.	.	.	.	.	.	.	.
267	PI 211642	91	78	4.8	0	1.1	14.6	7	48	5	0.5	0.26	62	
268	PI 211756	95	30	6.2	20	0.8	12.7	12	30	5	0.3	0.33	55	
269	PI 212635	95	54	6.1	0	0.7	9.5	7	41	4	0.2	0.30	29	
270	PI 214069	.	.	.	.	.	.	.	.	.	.	.	.
271	PI 214354	68	91	7.7	1	0.7	10.6	4	75	1	0.2	0.56	41	
272	PI 218122	68	87	6.4	0	0.7	11.0	4	75	1	0.1	0.16	41	
273	PI 221731	79	83	7.2	0	1.2	11.2	9	77	3	0.2	0.31	49	
274	PI 227827	88	84	6.7	1	1.6	17.5	10	42	7	0.4	0.10	94	
275	PI 229734	77	82	7.2	1	1.5	14.3	10	55	3	0.4	0.17	53	
276	PI 229796	71	80	7.9	5	0.8	12.7	7	61	2	0.4	0.16	44	
277	PI 246131	79	83	7.8	0	1.8	16.5	12	60	7	0.8	0.09	46	
278	PI 250416	77	77	7.4	0	1.5	16.5	11	59	6	0.2	0.05	67	
279	PI 255776	96	80	5.9	5	1.5	15.7	9	43	8	0.4	0.47	66	
280	PI 255782	95	90	5.7	0	1.3	16.5	50	73	1	0.2	0.33	109	
281	PI 255784	82	82	7.1	7	1.8	15.7	9	60	4	0.6	0.14	122	
282	PI 255792	76	80	6.2	0	1.7	15.7	6	56	7	0.5	0.07	87	
283	PI 255815	100	66	6.2	6	1.1	14.8	7	40	7	0.2	0.04	70	
284	PI 293460	74	64	7.1	0	1.3	13.3	9	47	7	0.5	0.18	55	
285	PI 293467	82	92	6.4	1	1.5	13.7	9	83	4	0.3	0.08	130	
286	PI 293468	85	90	7.1	2	1.6	15.2	8	59	5	0.2	0.11	126	
287	PI 293476	77	93	7.9	5	1.7	12.7	10	67	6	0.3	0.15	64	
288	PI 293494	77	85	7.6	0	1.1	11.9	9	64	5	0.2	0.09	55	
289	PI 293498	77	56	7.2	13	1.0	16.5	12	56	8	0.2	0.06	45	
290	PI 293514	79	94	7.4	17	2.2	17.8	11	76	6	0.3	0.10	127	
291	PI 293516	68	92	8.5	28	2.5	19.4	15	49	7	0.9	0.20	82	
292	PI 293526	77	94	7.5	8	2.0	15.2	10	68	7	0.4	0.02	94	
293	PI 293543	82	82	6.8	18	1.4	16.8	9	78	3	0.4	0.24	64	
294	PI 293550	77	92	7.2	6	2.2	17.5	13	60	7	0.7	0.14	68	
295	PI 293557	79	93	6.9	11	1.4	16.5	8	44	7	0.4	0.07	69	
296	PI 293573	88	88	6.1	5	1.7	19.1	15	36	8	0.3	0.08	70	
297	PI 293576	82	80	6.6	28	1.1	15.2	10	47	7	0.3	0.10	87	
298	PI 293584	79	79	7.6	10	1.9	18.2	8	53	10	0.4	0.04	111	
299	PI 293585	82	90	7.4	18	1.7	15.9	12	46	10	0.5	0.09	79	
300	PI 343449	109	73	6.7	18	1.5	15.9	13	26	5	0.7	0.14	65	

Table 3. Highest scoring entries for resistance to cowpea curculio and pod bugs in evaluation of *Vigna unguiculata* germplasm, Headland, Alabama, U.S.A., 1995.

Score	Description	100 seed (g)	Seed description	Pod length (cm)
14	BAMBEY-5	12.2	Large, speckled+hilar ring, kidney	17.5
13	IT82D-713	9.6	Medium, browneye+bicolor, rhomboid	13.0
13	UCR194=BBR-42	8.7	Small, black/white bicolor, kidney	17.8
12	PI-218122	4.5	Small, brown, kidney	10.9
12	TVU-3046	6.3	Small, brown, kidney	11.9
12	UCR200=24-1A	5.3	Small, cream, kidney	13.5
12	PI-115679	7.3	Small, black, kidney	17.8
11	PI-145198	6.2	Small, brown, marbled, ovoid	15.0
10	AU85-CCR-20	5.7	Small, cream, globose	10.7
10	UCR-202	7.5	Small, brown, kidney	14.5
10	IT-83S-911	16.5	Large, browneye+bicolor, kidney	21.6
9	VITA-5	8.8	Medium, brown hilar ring, rhomboid	15.2
9	CHARODI	5.5	Small, brown, rhomboid	11.2
9	N'DIAMBOUR	14.2	Large, brown hilar ring, kidney	16.0
9	UCR347=MN-150	12.6	Medium, brn&white bicolor, kidney	16.3
9	IT-86F-2062-5	10.1	Medium, brown+bicolor, kidney	23.6
8	PI-175959	8.6	Small, brown, ovoid	15.5
7	PI-293467	8.9	Small, brown, marbled, ovoid	13.7
7	CPI-30783	9.6	Medium, blue, marbled, ovoid	16.8
6	PI-142779	8.2	Medium, brown, marbled, ovoid	14.2
6	PI-255815	7.3	Small, black hilar ring, kidney	14.7
6	PI-148674	8.7	Medium, brown, ovoid-rhomboid	16.0
6	PI-214354	4.3	Small, brown, kidney	10.7
6	PI-353074	8.8	Medium, brn&white bicolor, kidney	26.7
6	PI-189374	6.9	Small, brown, kidney	12.7
6	UCR189=BBR-23	6.3	Small, brown, kidney	18.5
6	IT-82D-380-5	9.1	Small, black hilar ring, kidney	17.8
6	UCR-240	10.5	Small, black hilar ring, kidney	17.8



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